Chapter 4 Outline

* Histology = study of tissues
* Four main groups of tissue:
* Epithelial
* Connective
* Muscle
* Nervous
* Epithelial
* Location:
  + - Main tissue of skin’s outer layer; protective barrier
    - Membranes, ducts, lining of body cavity and hollow organs
* Three shapes (Fig. 4-1)
  + - Squamous — flat and irregular
    - Cuboidal — square
    - Columnar — long and narrow
* Cell arrangement
  + - Simple
      * Single layer
      * Thin barrier, materials pass through fairly easily
    - Stratified (Fig. 4-2)
      * Multiple layers
      * Offers protection
    - Transitional
      * Capable of expansion, return to original form
      * E.g., lining of bladder
* Special features (Fig. 4-3)
  + - Secretions — goblet cells; mucus, digestive juices, sweat, etc.
    - Cilia — hairline projections, with mucus help trap foreign particles
    - Cells reproduce quickly after injury — fast repair
    - Protection — modify selves to protect, e.g., calluses
* Connective tissue (see also Learning Outcome 4-3)
* Liquid
* Soft
* Fibrous
* Hard
* Muscle tissue (Fig. 4-7)
* Muscle fibers, designed to produce movement
* Heal with difficulty, sometimes replaced with connective tissue
* Skeletal muscle
  + - Works with tendons and bones to move body
    - Voluntary
    - Large cells in dark and light banding pattern known as striations
* Cardiac muscle (Fig. 4-7 B)
  + - Heart wall, called myocardium
    - Involuntary
    - Branching cells and specialized membranes between appear as dark lines — intercalated disks
* Smooth muscle (Fig. 4-7 C)
  + - Walls of hollow organs in ventral body cavities, the viscera
    - Walls of many tubular structures
    - Involuntary
* Nervous tissue (Fig. 4-8)
* Entire “communications” system, including the brain
* Nerves = bundle of nerve cells held together with connective tissue
* Nerves from throughout body meet in spinal cord
* The neuron (Fig. 4-8 A) — basic unit of nervous tissue
  + - Can be long
    - Consists of nerve cell plus small branches (fibers)
      * Dendrite — carries nerve impulses *to* nerve cell body
      * Axon — carries impulses *away from* nerve cell body
* Protected and insulated by myelin; groups of myelinated fibers form “white matter”
* Neuroglia or glial cells
  + - Specialized cells; get rid of foreign organisms, protect brain and axons
    - Nonconducting
* Two categories of glands
* Exocrine glands
  + - Have ducts or tubes to carry secretions away from gland
    - Carry secretions to another organ, body cavity, or body surface
    - Most composed of multiple cells in various arrangements
      * Tubular
      * Coiled
      * Saclike
    - Examples:
      * Glands in intestinal tract that secrete digestive juices
      * Sebaceous (oil) glands of the skin
      * Lacrimal glands, produce tears
* Endocrine glands (Fig. 4-4)
  + - Secrete hormones directly into the blood
    - Examples:
      * Pituitary
      * Thyroid

Adrenal

* Connective tissues
* Widely distributed
* Lots of nonliving material between the cells, the matrix
* Matrix composed of water, fibers, minerals
* Four categories, based on physical properties:
* Circulating
  + - Blood (Fig. 4-5A) and lymph
* Generalized (loose)
  + - Areolar (Fig. 4-5B) — loose, found in membranes between vessels, organs
      * Most common tissue in body
    - Adipose (Fig. 4-5C) — contains cells that can store fat
      * Insulation, padding
* Generalized (dense)
  + - Firmer than generalized loose tissue
    - Main type is collagen
      * Irregular dense: collagen fibers in random arrangement; covers organs (e.g., kidney, liver)

Regular dense: collagen fibers in parallel alignment; e.g., tendons, ligaments

* + - * Elastic, composed of many fibers that stretch and return to original shape (e.g., vocal cords)
* Structural
  + - Has very firm consistency
      * Includes cartilage — produced by chondrocytes
* Hyaline cartilage — found at ends of long bones (Fig. 4-6 B)
* Fibrocartilage — between segments of spine, in hip and knee joints
* Elastic cartilage — regains shape after bent; e.g., outer portion of ear
  + - * Osseous tissue (bone) (Fig. 4-6 C)

Formed by osteoblasts

* Membranes = thin sheets of tissue
* Cover surfaces,
* Act as dividers
* Line hollow organs or body cavities
* Anchor organs
* Secrete lubricants
* Epithelial membranes
* Outer surface = epithelium, with connective tissue underneath. Sometimes smooth muscle below that.
* Three types of epithelial membranes
* Serous membranes (Fig. 4-9)
  + - Continuous; line the closed ventral body cavities and fold back to cover organs there
      * Parietal layer — portion attached to wall or sac
      * Visceral layer — portion attached to organ
    - Secrete watery lubricant, serous fluid; allows organs to move without friction
    - Three serous membranes:
      * Pleurae — line thoracic cavity, cover each lung
      * Serous pericardium — forms part of sac that encloses heart
      * Peritoneum — lines walls of abdominal cavity, covers abdominal organs, supports
* Mucous membranes
  + - Produce mucus
    - Line passageways leading outside
    - Extensive continuous linings in digestive, respiratory, urinary, and reproductive systems
    - Some have cilia, move out foreign particles
    - Some protect deep stomach muscles from digestive juices

Cutaneous membranes (skin) has outer layer of epithelia.

* Synovial membranes
* Line joint cavities
* Secrete lubricating fluid
* Meninges
* Cover brain and spinal cord
* Fascia — found in two regions
* Superficial fascia — continuous, underlies skin, contains adipose
* Deep fascia — covers, separates, and protects skeletal muscles
* Fibrous pericardium
* Forms cavity that encloses heart, pericardial cavity
* Periosteum
* Membrane around a bone
* Perichondrium
* Membrane around cartilage
* Tissues: *histology, epithelial, pseudostratified, fibroblast, osseous, neuron*
* *hist/o* (tissue)
* *epi-* (on, upon)
* *pseud/o*- (false)
* *-blast* (immature cell, early stage of cell)
* *condro/o* (cartilage)
* *oss, osse/o, oste/o* (bone, bone tissue)
* *neur/o* (nerve, nervous system)
* Membranes: *pleurae, peritonitis, arthritis*
* *pleur/o* (side, rib)
* *peri-* (around)